CHBE 303 — Computer Programming in Chemical Engineering (Fall 2015)

Lecture:
Monday 1–1:50 PM HRZ 210
Sections:
#1 Monday 2-2:50 PM DCH Sym II Lab
#2 Wednesday 1–1:50 PM DCH Sym II Lab
#3 Wednesday 2–2:50 PM DCH Sym II Lab
#4 Friday 1–1:50 PM DCH Sym II Lab
#5 Friday 2–2:50 PM DCH Sym II Lab
Instructor: Dr. Dilip Asthagiri
Office: Abercrombie B235
Office hours: By appointment (preferred); walk-in welcome if door is open

Course outline

The aim of this course is to provide you with sufficient background in programming to get you started in using computational approaches to solve problems in Chemical Engineering. It is hoped that by the time you are ready to graduate, with repeated practice, you will have developed a reasonable background in scientific/engineering computing.
We will learn the basic concepts of programming using MATLAB drawing upon examples from the pillars of chemical engineering — material/energy balance (CHBE 301), Transport Phenomena (CHBE 401/402), Thermodynamics (CHBE 411/412), and Reaction Engineering (CHBE 390) — and more! Our focus will be on writing clear codes, modular programming, and code reuse. Ideally, you should save code fragments from examples/assignments to use in your other classes.

Syllabus

1. Classes 1 to 3 — Introduction to algorithms, flowcharts, and MATLAB basics
2. Class 4 — Case study 1: Matrix algebra to solve material balances (CHBE 301)
3. Classes 5 & 6 — Case study 2: Random numbers and regression in modeling a random walk (CHBE 401/402, CHBE 411/412)
4. Classes 7 & 8 — Case study 3: Root finding and solving equilibrium “flash" of a multicomponent mixture (CHBE 301, 411/412)
5. Class 9 — Case study 4: Basic Integration to compute enthalpies from given data (CHBE 411/412)
6. Classes 10 & 11 — Case study 5: Solving an ODE in kinetics (CHBE 301/310/390)
7. Class 11 & 12 — Case study 6: Solving a system of ODEs in a batch distillation process (CHBE 301/412/470)

Course Organization

- The main lecture will tend focus mostly on the concepts
- Video tutorials will supplement the assignment each week

- Assignments will typically be due every Monday (by class-time)
- Sections will be devoted to working on problems that will help you with the assignments

Course materials

1. Lecture notes and video tutorials will be posted on OwlSpace/YouTube.
2. In lieu of a class textbook, please get the student version of MATLAB (version R2015a)

Homework and grading policy

1. **Unlike years past, there will be no regrading of assignments**
2. Late home work will be penalized at the rate of 20% per day late, unless prior permission has been obtained from the instructor.
3. Grading policy

Grade	%
Assignments	
In-section work	20%
Final submission	35%
Quiz 1	15%
Quiz 2	15%
Quiz 3	15%

4. Grades will be assigned as follows:

Grade	%	Grade	%
A+	≥ 97.5	C+	$72.5 - 79.9$
A	$92.5 - 97.4$	C	$65.0 - 72.4$
A-	$90.0 - 92.4$	C-	$60.0 - 64.9$
B+	$87.5 - 89.9$	D+	$57.5 - 59.9$
B	$82.5 - 87.4$	D	$52.5 - 57.4$
B-	$80.0 - 82.4$	D-	$50.0 - 52.4$
		F	< 50

It is theoretically possible that the entire class could get an A or an F. Since the grades are not curved, your performance depends only on what you do. This presents an **opportunity** for you to learn from each other, while acting within the bounds of academic integrity. In borderline cases, a student's grade may be raised to the next higher level, if justified by the student's participation in the class and general academic performance.
If a student believes an error was made in grading (homework or quiz), he or she should see the instructor within **one** week after the homework or quiz was returned. For quizzes, it must be noted that the entire quiz will be re-graded not just the problem in question, in order to ensure consistence and fairness.

Honor code Policy

"Students are encouraged to talk to each other, the teaching assistants, the instructor, or anyone else about any assignment in the course that is not specifically designated as pledged. This assistance if limited to the discussion of the problem and perhaps sketching of a solution. Consulting another student's solution is prohibited and submitted solutions to assignments may not be copied from any source."

ADA Statement

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with the instructor during the first two weeks of class. All discussions will remain confidential. Students with disabilities will need to also contact Disability Support Services in the Allen Center.

Teaching Team

Instructor	Dr. Dilip Asthagiri: `Dilip.Asthagiri@rice.edu`
Undergraduate TAs	
	Ellen Munday: `esm3@rice.edu`
	Midori Rinkliff: `mer6@rice.edu`
	Joseph Ni: `zn1@rice.edu`
Graduate TAs	
	Ziyi Zhu: `zz27@rice.edu`
	Caleb Sisco: `cs51@rice.edu`